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ABSTRACT

In response to criticism of the peer review publication process, a study surveyed a random sample of 600 members of the American Psychological Association (APA) to determine (1) whether professional openness exists regarding the publication of a journal highlighting studies that, due to a difficulty in the experimental procedure, would usually be rejected for publication even though they have important contributions to make; and (2) whether psychology as a profession feels that such a journal would be of value. Responses from 128 members indicated that respondents were cautious concerning a willingness to subscribe to the proposed journal and were not significantly willing to submit research to it; however, they were far more open about their willingness to read the journal. Respondents who said they would submit to, subscribe to, and/or read the proposed journal gave higher ratings than those classified as nonsubmitters, nonsubscribers, and nonreadesrs to the following four journal functions (out of the seven addressed in the survey); partial contributions, inconsistent rejection reasons, "serendipity", and education. Subscribers gave lower ratings than nonsubscribers to the "warning" and "solution" functions. Readers rated these functions and the seventh function, "humor," higher than did nonreaders. Willingness to subscribe to the journal was found to be the most stringent criterion. Results supported the conjecture that numerous APA members feel that they are being prevented from getting research studies published, generally support the notion that a need exists for a novel approach to publishing within the profession, and appreciate the role that serendipity, or chance, has to play in the advancement of scientific information. References and tables are appended. (JD)

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# Assessing Professional Openness to a Novel Publication Approach

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Abstract

A survey of APA Members was conducted in response to the growing criticisms of the peer review publication process primarily centering on the lack of interrater reliability and the existence of reviewer bias. The survey instrument was designed to gauge professional openness and perception of value toward the creation of a journal that would take a novel approach to research dissemination. Three discriminant analyses were performed using three variables representing varying levels of openness to the proposed journal as criteria. Predictors included seven functions such a journal might serve, as well as various barriers encountered in attempting to publish research. Results indicated a cautious but open attitude toward the creation of the proposed journal.

## Assessing Professional Openness to a Novel Publication Approach

### Problems Inherent in the Peer Review Process

Within the field of psychology, as well as the other scientific disciplines, a great deal of importance is placed on conducting and publishing research. The decision regarding what research gets published is usually the outcome of peer review. Recently, a growing number of researchers have raised important questions about the adequacy of the peer review system. Criticisms of the review process and accompanying calls for improvement have surfaced regarding the review practices of journals in both the social sciences (Brackbill & Korton, 1970; Crane, 1967; Gove, 1979) and the physical sciences (Ingelfinger, 1974; Ruderfer, 1980; Stumpf, 1980). Two major classifications of criticism surrounding the peer review process concern the issues of Interrater Reliability and Reviewer Bias.

Interrater Reliability, described as agreement among the reviewers of a manuscript, with few exceptions (Crandall, 1978; Scarr & Weber, 1978) is typically reported as low to moderate. Cicchetti (1980) reported the best interrater reliability with an interclass correlation coefficient of .54. Moderate interrater reliabilities are reported by Marsh and Ball (1981) of .34 for the Journal of Educational Psychology and by Mahoney (1977) of .30 for the Journal of Applied Behavioral Analysis. Whitehurst (1982) reported an interclass correlation coefficient of .29 across two related journals, Developmental Review and Merrill-Palmer

Quarterly. Scott (1974) in an examination of the manuscripts submitted to the Journal of Personality and Social Psychology found the degree of agreement between reviewers of manuscripts to be .26. Even lower correlation coefficients of only .21 were reported by Henrick (1976, 1977) for the Personality and Social Psychology Bulletin. Watkins (1979) in a later study of manuscripts submitted to the Personality and Social Psychology Bulletin, found a near total lack of agreement among reviewers using Kappa, a statistic that shows the degree of reviewer agreement remaining after correcting for chance.

Recent efforts by Whitehurst (1983,1984) introducting an alternative approach to computing reviewer agreement have improved reliabilities somewhat. Responding to criticisms of using interclass correlations, which compare error variance with variance due to manuscripts, Whitehurst has proposed the use of Finn's $r$ statistic. He argues that Finn's $r$ is more appropriate for the purpose of assessing reviewer agreement because it compares the variance within manuscripts to the variance that would have been obtained if ratings had been assigned randomly. Whitehurst stresses that unlike Kappa, Finn's $r$ possesses the added advantage of being uneffected by the homogeneity of the sample manuscripts from which they are derived. Using this method he reports more reliable results overall across three data sets. However, Whitehurst (1984) nonetheless concludes:

Though things may be better than they seemed, we should

> probably not be satisfied with procedures that allow the fate of half or more of the manuscripts submitted to journals to be a result of what is, at worst, caprice and bias, or at best unanalyzed and esoteric editorial jugdement. (p.27)

Another even more subtle measure of interrater reliability was noted by Smigel and Ross (1970). Using the editorial records of Social Problems during the years 1958 to 1961, the authors found agreement to accept or to reject considering the original two editorial consultants in 72.5% of the mauscripts read. But in the more than one fourth of the manuscripts in which disagreements occurred, it was the description of the disagreements that was important. In many instances, reviewers opted to reject or to accept a manuscript for identical reasons, often using the same language. One reviewer recommended rejection because he considerd his criticisms serious ones. The second reviewer regarded essentially the same criticism as minor and therefore opted for publication.

Another area of concern in the peer review publication process is the possibility of response bias. Mahoney (1977) found evidence of bias using 75 journal referees as subjects to review manuscripts describing identical experimental studies, but which reported positive, negative, mixed, or no results. Among the conclusions drawn by Mahoney were that referee evaluations may be dramatically influenced by such factors as experimental outcome, and referees are strongly biased against manuscripts which report results

contrary to their theoretical perspective.

Most claims of reviewer bias however point to institutional bias as the predominant form of bias operating in the publication process. In their presentation of the history and structure of the referee system, Zuckerman and Merton (1973) describe the development of a possible fore-runner to institutional prejudice. Discussing the beginnings in the seventeenth century of the institutionalization of evaluative judgements, they describe the establishment of property rights in discovery sought after by scientists as individuals and nationals. This interest in demonstrating national prominence possibly constituted the initiation of competiveness regarding priority of discovery as well as veracity of ideas.

Gordon (1980) analyzed reviewer reports of 619 physical science articles received over a six year period by several prestigious journals. Each set of reviewer reports and manuscripts was coded in terms of the institutional identity of its referees and authors. The results indicated that major university referees evaluate manuscripts from major universities significantly more favorably than manuscripts from less prestigious universities. But for less prestigious university referees there was little difference in the evaluation of manuscripts from high or low status universities.

In a more recent study, Peters and Ceci (1982) chose the natural setting of the publication process, and actual journal

referee evaluations of resubmitted manuscripts served as a dependent variable. Selected as material for the investigation were 12 already published research articles by authors from prestigious and highly productive American psychology departments, one article from each of 12 highly regarded and widely read American psychology journals that had originally refereed and published it 18 to 32 months earlier after altering the manuscripts by substituting fictitious names and institutions for the original ones. Surprisingly, only three of the articles were detected as resubmissions. The overwhelming majority of editors and reviewers failed to recognize the manuscripts as articles that had appeared in the mainstream literature appropriate for that research area during the past 18 to 32 months. Of the nine articles that continued through the review process to receive an actual evaluation eight were rejected. The grounds for rejection in many cases were described as serious methodological flaws. The Peters and Ceci study support Gordon's finding by reporting that the predominantly negative evaluations of the resubmissions may reflect bias in favor of the original authors as a function of their association with prestigious institutions.

Evidence also exists that institutional bias may occur even with anonymously submitted manuscripts. Crane (1967) reported a study involving one journal each from economics, social psychology, and sociology. She found a slight degree of bias in that an editorial board which is similar in academic affiliation where the

doctorate was earned was more likely to select manuscripts from researchers with similar characteristics.

Effects of the Controversy Surrounding the Publication Process on Scientific Inquiry

The controversy surrounding the peer review publication process has created a bleak picture for the process of scientific finding dissemination. Abelson (1979), in an editorial in Science, commented on the scientific spirit in America based on his informal conversations with numerous professors from widely scattered institutions. Abelson formed the impression that, rather than researchers considering research as fun and the best possible of all activities, the majority of researchers were gloomy and some were bitter. Zuckerman and Merton (1973) presented evidence that such negative feeling toward the publication process was especially detrimental to young researchers. Based on the evidence that collegial recognition of the work of novice scientists is important for their continued productivity, the discouragement of having papers rejected may be more significant for the novice than for the established scholar.

The discouraging atmosphere prevelant within the scientific community is contrary to the original intent of the referee system. In the seventeenth century, as a response to the emerging social organization of scientists and the goal of developing scientific inquiry, scientific works were put into publication. For the purpose of enhancing scientific interchange, the referee system

evolved. It was at this time that the practice developed of having the substance of manuscripts legitimized through evaluation by institutionally assigned and competent reviewers (Zuckerman & Merton, 1973). Authors enthusiastically seized the opportunity to have valid appraisals of their work performed by other scientists. But in more recent times, the influx of manuscripts judged to be beyond all hope of scholarly redemption testifies to the ambiguity and wide range of standards of scholarship.

The Lost Role of Serendipity in Scientific Pursuit

The current publication process also ignores the well-documented role of chance in science. Koestler (1964) credits creativity as being the primary force behind scientific discovery and invention, in which gains are made in an unsystematic, unforeseeable, and accidental way by forgetting at the right moment what is already known. Austin (1977) presents research in all its haphazard, unpredictable complexity rather than the tidy, aseptic accounts that fill our libraries. He describes research as a series of contigencies and zigzags joined by one fragile link after another. Within the field of psychology, two very prominent scientists have also stressed the important role of chance in contributions to the growth of science. Skinner (1959) presented his unformalized principles of scientific practice which vigorously dissent from any formal view of the scientific method. One of these principles, stating that apparatus sometimes breakdown, was directly responsible for Skinner's finding of an extinction curve.

In addition, his law of serendipity accounted for his discovery of the fixed-ratio performance curve. Campbell (1960) concurred with the view that chance plays an important role in research. He observed that in instances of real scientific gain, the successful explorations were in origin as blind as those which failed, but the successes obtained through blind variation were selectively retained.

The role of chance is not to be extolled as justification for poor research or ignorance of the scientific method, but rather to salvage notable research which although properly conceived, involved an event nullifying its importance in the traditional publication system.

Novel Approaches in Treating Scientific Subject Matter

Although it appears that presently no forum for research dissemination exists to deal with less than perfect experimentation, two journals are being printed that take a somewhat different approach to treating scientific subject matter. The Journal of Irreproducable Results has for some time been printing spoofs concerning a number of issues relevant to scientific inquiry. One such spoof by Swindel and Perry (1975), describing the production of an excess of well established referees for the purpose of perpetuating the status quo in research, sets forth the golden rule of arts and sciences: whoever has the gold makes the rules. In the process of proving this universal theorem, one of the corollaries utilized by the authors states that if one

frequently publishes with ease, his or her work does not advance the scientific field, but simple characterizes it. More recently the Journal of Polymorphous Perversity went into publication. Concentrating on the field of psychology, this publication is advertised as a humorous and satirical journal (Journal of Polymorphous, 1984).

Summary

To summarize, this author is proposing the creation of a psychological journal that will overcome the barriers inherent in the typical publication process by broadening the range of acceptability of research methods and results, with as its goal a return to the basic spirit of science. Such an effort seems justified given the conditions that presently exist within the peer review publication process in the discipline of psychology. Four conditions have been delineated to support this approach. First of all, the peer review process is rife with criticisms, primarily focusng on the lack of interrater reliablity and the operation of bias on the part of editors and reviewers. Secondly, the entire range of critical attacks has taken its toll on the fervor with which scientific inquiry is pursued. Thirdly, science in general, and psychology in particular has lost appreciation for the role chance is able to play in scientific advancement. Finally, the ground has been broken by novel approaches to traditional subject matter, giving a new perspective to different ways of dealing with research issues.

To this end, the present study had as its purpose the conducting of a survey of psychologists, to determine if a perceived need exists in the field for a journal highlighting studies that due to a difficulty in the experimental procedure would categorically be rejected for publication but nevertheless have important contributions to make. As such this study addressed two research questions:

1. Does there exist professional openness to the publishing of a journal of this type?

2. Does psychology as a profession see the creation of such a journal as having value?

## Method

### Subjects

Subjects for this study were obtained by mailing surveys to a random sample of 600 American Psychological Association Members residing in the United States, who were also journal subscribers. The subject sample consisted of 123 respondents to the survey, representing roughly a 20% return rate. The sample was comprised of 74.6% men and 25.4% women. Ages of the subjects ranged from 25 to 73 years, with an average age of 41 years.

Treatment of all subjects was in accordance with the ethical standards of the American Psychological Association guaranteeing the anonymity of responses and the voluntary nature of participation in the study (APA, 1981).

### Materials

The materials for the present study consisted of a survey primarily made up of Likert scale and multiple choice items. Items were constructed to address the research questions.

In an effort to assess whether or not the profession of psychology saw the creation of such a journal as having value, the first part of the survey consisted of seven 5-point Likert scale items, ranging from disagree stongly (1) to agree strongly (5). The seven scale items measured the respondents' indications of agreement with seven functions of the proposed journal as being desirable for the respondent personally or professionally. The seven functions were labelled descriptively as partial contributions, warning, solutions, education, serendipity, humor, and inconsistent rejection reasons. Partial contributions referred to the reporting of the partial findings from a flawed study that were not contaminated by the error. The function labelled warning consisted of the identification of errors committed in a research study for the purpose of warning independent researchers regarding the need to take increased care to control experimental conditions. Solutions involved the presentation of solutions to problems encountered in research in an effort to provide suggestions for redesigning research efforts. The education function consisted of the establishment of a tool for educating budding professionals with regard to possible sources of error as well as solutions to be applied. The function labelled serendipity was described as providing a forum for the reporting of

serendipitous findings and results in which chance played a role. Humor refered to the reporting of a humorous account of a glaring oversight or other intentional or unintentional incident in the process of experimentation. Inconsistent rejection reasons as a function involved the printing of research that had previously been rejected as the result of contradictory peer review evaluations, including the publishing of anonymous excerpts from the reviews. Overall, these scale items were designed to gauge the opinions of the subjects on seven types of functions the proposed journal might serve.

To measure professional openness to the idea of the proposed journal, five items were included in the survey. Three 4-point Likert scale items, ranging from very unwilling (1) to very willing (4), evaluated the respondents' willingness to submit research to, subscribe to, and read such a journal. Other items asked respondents to indicate the number of times they have been prevented from publishing their research and the nature of the barriers to publishing they have encountered.

Procedure

Surveys were mailed with an attached cover letter explaining to the participants the purpose of the survey and the author's institutional affiliation. Also included in the cover letter was an outline of the manner by which the participants were selected for inclusion in the study, the voluntary nature of participation in the study, a guarantee of anonymity, and instructions for

returning the survey.

Approximately three weeks were allowed from the mailing date for participants to return surveys before data analysis began.

## Results

Three criterion variables were identified for utilization in the analysis of the data. These variables resulted from the participants' indications of willingness to submit research studies to the proposed journal, to subscribe to the proposed journal, and to read the proposed journal.

Each of the criterion variables was dichotomized for purposes of the data analysis. Participants who indicated that they were willing or very willing to submit research to the proposed journal were labelled submitters. Participants who indicated that they were unwilling or very unwilling to submit research were labelled nonsubmitters. The label subscribers was given to participants who indicated that they were willing or very willing to subscribe to the proposed journal. On the other hand, those participants labelled as nonsubscribers had indicated that they were unwilling or very unwilling to subscribe. Readers were so labelled due to indicating that they were willing or very willing to read the proposed journal if it was available. Nonreaders, on the other hand, were labelled as such because they had indicated that they were unwilling or very unwilling to read the proposed journal. These dichotomizations resulted in each participant being labelled as a submitter or nonsubmitter, a subscriber or nonsubscriber, and

a reader or nonreader.

A chi-square comparison was computed for each of the dichotomized criterion variables to assess if the freqencies within the labelled categories significantly differed. The comparison of submitters ($n$ = 70) to nonsubmitters ($n$ = 53) yielded a nonsignificant chi-square value, $X^2(1, N = 123) = 2.08$, interpreted as meaning that the ratio of submitters to nonsubmitters did not significantly differ. However the comparisons of both subscribers ($n$ = 50) to nonsubscribers ($n$ = 73) and readers ($n$ = 86) to nonreaders ($n$ = 37) resulted in significant differences. The results indicated that significantly less of the participants would subscribe compared to the number who would not subscribe, $X^2(1, N = 123) = 3.94$, $p<.05$, but that significantly more of the participants would read the proposed journal compared to the number who would not read it, $X^2(1, N = 123) = 18.75$, $p<.01$. The participants' responses on all other survey items were analyzed on the basis of each of these three classifications.

Table 1 presents the average ratings for each of the functions of the proposed journal for submitters and nonsubmitters. Tables 2

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Insert Tables 1, 2, and 3 about here

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and 3 respectively present the average ratings of the functions for subscribers and nonsubscribers, and readers and nonreaders.

The participants' indications of how often they had been

prevented from getting a study published resulted in an overall mean of 1.73. In order, means for submitters, nonsubmitters, subscribers, nonsubscribers, readers and nonreaders were 1.91, 1.49, 2.36, 1.30, 1.63 and 1.94.

The data consisting of the barriers to publishing which the respondents had encountered were very similar for the subgroups of each of the criterion variables. Overall, statistical barriers were the most common problems in attempting to publish research, encountered 44.7% of the time. The second most common problem encountered in 34.1% of publishing attempts was indicated as methodological barriers. Also, commonly encountered 22.8% of the time each were planning barriers and review process barriers including the lack of interrater reliability and the existence of bias. Least often encountered as problems in publishing were miscellaneous barriers and barriers not under the direct control of the researcher, found in 11.4% and 13.8% of the time respectively.

In an effort to obtain a comprehensive overview of the data, a discriminant analysis was performed for each of the criterion variables. Predictors included the following survey items: the ratings of the seven functions, the number of times prevented from being published, and barriers to publishing.

The stepwise discriminant analysis performed in an effort to differentiate submitters from nonsubmitters resulted in a Canonical correlation of .71, $p<.01$. Presented in Table 4 are the five predictors, accounting for 50% of the variance, found to

significantly discriminate submitters and nonsubmitters. Based on

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Insert Table 4 about here

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the results of this analysis, submitters were described as rating four of the functions of the proposed journal--education, partial contributions, inconsistent rejection reasons, and serendipity--as more desirable than nonsubmitters. In addition, submitters compared to nonsubmitters had more often encountered statistical barriers to getting research published.

Nine of the predictors statistically distinguished between subscribers and nonsubscribers, accounting for 40% of the variance. The outcome of this stepwise discriminant analysis, resulting in a Canonical correlation of .63, $p<.01$, is presented in Table 5. The

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Insert Table 5 about here

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descriptive profile for subscribers as opposed to nonsubscribers included the following characteristics: more desirable ratings for the four functions of education, partial contributions, inconsistent rejection reasons, and serendipity; less desirable ratings for the solutions and warning functions; and more encounters with methodological, statistical, and miscellaneous barriers to publishing.

The stepwise discriminant analysis performed for the purpose

of differentiating readers from nonreaders resulted in a Canonical correlation of .75, $p<.01$. The 10 predictors that were found to significantly discriminate between readers and nonreaders are presented in Table 6. These 10 predictors accounted for a total of

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Insert Table 6 about here

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56% of the variance. Readers as opposed to nonreaders were described by the following traits: more desirable ratings for the six functions of partial contributions, inconsistent rejection reasons, warning, serendipity, solutions, and education; less desirable rating for the humor function; fewer encounters with review process and miscellaneous barriers to publishing; and fewer times prevented from being published.

In summary, the discriminant analyses pointed to the various ratings of the functions of the proposed journal as being the best discriminators. Function ratings not only represented the top two predictors for all criterion variables, but also represented the majority of the significant predictors for all criterion variables. Additionally, various barriers to publishing were also frequently found to discriminate between the subgroups of the criterion measures.

## Discussion

The initial purpose of the study was to investigate whether or not the profession of psychology was open to the idea of the

proposed journal. The results indicated that while respondents were very cautious concerning a willingness to subscribe, and did not indicate a willingness to submit research significantly more often than an unwillingness to submit, they were open as far as being willing to read the proposed journal. So, while the respondents overall were hesitant to strongly support the proposed notion, they were at least willing to give it a try.

The results of the analyses yielded variables that significantly discriminated between the dichotomized categoies of all three criterion measures. This approach found that respondents were more willing to submit research to the proposed journal if they had encountered statistical barriers to publishing research. Also the results pointed to an increased willingness to subscribe if respondents had encountered statistical barriers to publishing research. In addition, the results found an increased willingness to subscribe if the respondents had encountered methodological and other miscellaneous barriers in attempting to publish research. The discriminant analysis found that readers had encountered less review process and miscellaneous barriers to publishing and had been prevented from publishing less times than nonreaders.

The second purpose for the present study was to ascertain whether or not the profession of psychology felt the proposed journal had value as defined by the ratings of the possible functions of the journal.

The pattern of responses resulting from the discriminant

analysis provided information concerning which function ratings specifically discriminated between the levels of each criterion measures. Submitters compared to nonsubmitters gave higher ratings to the four functions of partial contributions, inconsistent rejection reasons, serendipity, and education. Subscribers compared to nonsubscribers gave higher ratings to the same four functions as did submitters, and additionally rated the warning and solution functions lower than did nonsubscribers. Readers also rated the same four functions higher than nonreaders as did both submitters and subscribers. Readers also rated the warning and solutions functions higher and the humor function lower than did nonreaders.

The distinctively differential frequencies of participants' indications of openness on the various criterion measures led to the conclusion that each criterion represented a different level of risk to the participant. The most stringent criterion appeared to be willingness to subscribe to the proposed journal. While there were more submitters than subscribers, the number of submitters was not significantly greater than the number of nonsubmitters. Submitters, although matching the same basic descriptive pattern as subscribers, were not differentiated on as many variables from nonsubmitters as subscribers were from nonsubscribers. Readers on the other hand were significantly overrepresented among respondents. Because a large portion of the respondents indicated a willingness to read the proposed journal, it was concluded that

this criterion was the least stringent of the three. Also the descriptive pattern of readers was reasonably different from that of submitters and subscribers examplified by the finding that readers had actually encountered fewer barriers to publishing. It was concluded that this unique descriptive profile of readers was possibly due to readers as a group being less homogeneous than either submitters or subscribers as a result of the criterion being less stringent.

To summarize, the results of the present study were interpreted as substantiating the existence of concern with the current peer review process. The results provided evidence that members of the profession of psychology indeed felt that they were being prevented from getting meritorious research studies published. Among the specific barriers to publishing they had encountered were notably review process barriers including the lack of interrater reliability and reviewer bias.

Additionally, while the response was cautious, the profession generally indicated an open attitude toward the proposed journal idea. Furthermore, the suggested functions of the proposed journal were, for the most part, favorably accepted supporting the notion that a need exists for a novel approach to publishing within the profession of psychology. A renewed interest in enhancing scientific fervor was also evidenced by the acceptance of the functions representing a widening range of acceptable research for publication. Finally, the strong support given to the desire for

the journal to report research accounts in which serendipitous circumstances played a part establishes an appreciation for the possibly advantageous role chance has to play in the advancement of scientific information.

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Table 1

Average Function Ratings for Submitters and Nonsubmitters

| Function | Nonsubmitters | Submitters | Mean |
|---|---|---|---|
| Partial contributions | 2.41 | 3.77 | 3.20 |
| Warning | 3.18 | 4.10 | 3.72 |
| Solutions | 3.39 | 4.35 | 3.95 |
| Education | 2.55 | 4.07 | 3.44 |
| Serendipity | 2.63 | 3.91 | 3.38 |
| Humor | 2.10 | 3.42 | 2.87 |
| Inconsistant rejection | 2.73 | 4.13 | 3.55 |
| Mean | 2.71 | 3.96 | 3.44 |

Table 2

Average Function Ratings for Subscribers and Nonsubscribers

| Function | Nonsubscriber | Subscriber | Mean |
|---|---|---|---|
| Partial contributions | 2.70 | 3.92 | 3.20 |
| Warning | 3.51 | 4.02 | 3.72 |
| Solutions | 3.72 | 4.26 | 3.95 |
| Education | 2.98 | 4.08 | 3.44 |
| Serendipity | 2.93 | 4.02 | 3.38 |
| Humor | 2.51 | 3.39 | 2.87 |
| Inconsistant rejection | 3.09 | 4.20 | 3.55 |
| Mean | 3.06 | 3.98 | 3.44 |

Table 3

Average Function Ratings for Readers and Nonreaders

| Function | Nonreaders | Readers | Mean |
|---|---|---|---|
| Partial contributions | 2.06 | 3.69 | 3.20 |
| Warning | 2.69 | 4.16 | 3.72 |
| Solutions | 3.03 | 4.34 | 3.95 |
| Education | 2.34 | 3.90 | 3.44 |
| Serendipity | 2.37 | 3.81 | 3.38 |
| Humor | 1.97 | 3.25 | 2.87 |
| Inconsistant rejection | 2.43 | 4.02 | 3.55 |
| Mean | 2.41 | 3.88 | 3.44 |

Table 4

Significant Predictors in Discriminating Submitters and Nonsubmitters

| Step | Predictor | Discriminant Coefficient | F |
|---|---|---|---|
| 1 | Education function | .61 | 45.84** |
| 2 | Partial contr. function | .43 | 39.83** |
| 3 | Statistical barriers | .34 | 32.71** |
| 4 | Inconsistant rej. function | .31 | 27.17** |
| 5 | Serendipity function | .16 | 21.98** |

**p<.01.

Table 5

Significant Predictors in Discriminating Subscribers and Nonsubscribers

| Step | Predictor | Discriminant Coefficient | F |
|---|---|---|---|
| 1 | Education function | .71 | 21.54** |
| 2 | Partial contr. function | .48 | 28.75** |
| 3 | Inconsistant rej. function | .35 | 13.67** |
| 4 | Solutions function | -.34 | 7.94** |
| 5 | Methodological barriers | .27 | 10.14** |
| 6 | Warning function | -.26 | 11.66** |
| 7 | Serendipity function | .22 | 8.87** |
| 8 | Statistical barriers | .21 | 17.14** |
| 9 | Miscellaneous barriers | .19 | 7.98** |

**$p < .01$.

Table 6

Significant Predictors in Discriminating Readers and Nonreaders

| Step | Predictors | Discriminant Coefficient | F |
|---|---|---|---|
| 1 | Partial contr. function | .54 | 41.81** |
| 2 | Inconsistant rej. function | .40 | 33.17** |
| 3 | Warning function | .37 | 27.64** |
| 4 | Serendipity function | .28 | 20.34** |
| 5 | Review barriers | -.23 | 17.82** |
| 6 | Humor function | -.21 | 15.96** |
| 7 | Solutions function | .20 | 13.07** |
| 8 | Education function | .20 | 39.63** |
| 9 | Times prevented | -.19 | 23.52** |
| 10 | Miscellaneous barriers | -.18 | 14.32** |

**$p < .01$.